MBA ENERGY MASTERS

ENERGY MANAGEMENT

BUILDING SUSTAINABILITY

SUSTAINABLE MOBILITY MANAGEMENT

PROGRAM

ELECTIVE MODULES

WINTER SEMESTER **2023/24**

Last updated on: 11-Jan-24

THIS PUBLICATION REFLECTS THE STATE OF PLANNING AT THE TIME OF PRINTING.

Changes may occur, also due to Covid-19. Restrictions and precautions to teaching might apply.

TUBS GmbH
TU Berlin ScienceMarketing
Hardenbergstr. 16-18
(HBS1, room 510)
10623 Berlin/Germany

Content

Dear students,

As stated in the MBAs regulation, in the third semester, each student needs to take two elective courses. You have selected two courses, of your choice, among the nine courses listed below.

The electives will conclude, with the Master Thesis, your activities for the MBA. In this brochure, you find the contents, dates, exam procedures, and lecturers engaged in each of the electives.

Our best wishes for a fruitful final semester!

The MBA Energy Master’s team

Overview

Outline

Location and Times

Unless otherwise announced, lectures, tutorials, consultancy, and peer group meetings take place at House 9, EUREF-Campus, 10829 Berlin. The time is CET.

Third semester

Winter Semester 2021/22

Duration of the semester:	01.10.2023 - 31.03.2024
Lecture period:	16.10.2023 - 18.02.2024
Lecture-free period:	25.12.2023 - 31.12.2023 as well as public holidays

Lectures

Lectures are held by professors and academic staff of TU Berlin and other universities, and by professionals of the mobility industry. Group work is frequent. Homework may be assigned. Lectures start *sin tempore*, i.e. sharp.

Company Visits

Company Visits give the opportunity to go and see the company on-site and see course-content livelier presented. Registration before attendance may be required.

German Classes

Language classes are offered on campus and incur a small additional fee. Advanced language classes are available, for which taking a test is mandatory.
For more information, visit the website of Sprach- und Kulturbörse here.

E-Learning Platform ‘Moodle’ and WirelessLAN

Information **S**ystem for **I**nstructors and **S**tudents (ISIS)/Moodle is a software for online learning platforms for announcements, distribution of material, registration to events, etc. An introduction will be given in the first week. Please log on frequently, even in lecture-free times. The TU Berlin offers WirelessLAN (WLAN) with full coverage across its campus. Students can access the internet from any point on the campus.

Exams

An exam concludes each module. Everything that was taught in the lectures, tutorials, and compulsory company visits within the module may be subject to examination. Exams start on time! In case a student wishes to withdraw from an exam, they must inform the competent body at least one day before the exam date; in case of a valid reason (e.g. sickness), a student can withdraw from an exam anytime but have to inform the competent body and submit a proof latest 5 days after the exam date. Otherwise, the exam will be marked as failed. A failed examination may be repeated twice. For further details, please refer to the official Study and Examination Regulation.

Grading Scale

Grade	Assessment	Definition
1.0 / 1.3	Very good	Outstanding performance
1.7 / 2.0 / 2.3	Good	Performance above average requirements
2.7 / 3.0 / 3.3	Satisfactory	Complies with the average overall requirements
3.7 / 4.0	Adequate	Performance which, despite some flaws, still complies with performance requirements
5.0	Inadequate	Performance with significant flaws which does not comply with requirements

Third Semester

WiSe 2023/24

Social and Academic Events

Christmas Dinner

15th December
Venue to be announced*

Fun Events

E1 Efficiency Management

6 ECTS – hosted by MBA Energy Management

Prof. Dr.-Ing. Joachim MÜLLER-KIRCHENBAUER

Institute Technologie und Management
(ITM) Faculty Wirtschaft und
Management
T.U. Berlin

Aims and Scope

The students will be able to define, evaluate, and analyze technical projects and structures such as buildings, factories, and urban districts. They do this by integrating the technological, economic, business, and legal operations in companies and organizations and by taking social responsibility and sustainable development into account.

Course Content

Buildings and energy efficiency; greenhouse gas emissions, demand-side management, combined heat and power generation, process chain management, energy efficiency technologies, amortization processes, local heating, and cooling networks, project management, ISO standards and, depending on the focus of studies, links to the energy, building or transport sector.

Examination (6 ECTS, graded)

Assessment: The course will be graded, but the grade does not count toward your overall GPA
Type of assessment: **Portfolio**
Students who do not pass may repeat at the end of the current semester. Task and point allocation

- Contribution to the discussion: 25%
- Oral presentation: 50%
- Presentation materials / written composition (term paper): 25%

Schedule

Wed. 2023-10-25, Fri. 2023-11-10, Sat. 2023-11-25, Sat. 2023-12-02, Fri. 2023-12-08, Wed. 2024-01-10, Fri. 2024-01-19, Fri. 2024-02-02, Fri. 2024-02-09, Fri. 2024-02-16

Wed. 2023-10-25	Introduction	
09:30 – 11.00	Module Introduction, General framework in Europe and Germany, National Action Plan of Energy Efficiency (NAPE)	Prof. Müller-Kirchenbauer
11.15 – 12.45	Group Assignments and Assessment Criteria, Group get-together and company research	Academic Program Manager Gernot Bohmann
13.45 – 15.15	Company Presentations & Get-together	
15.30 – 17.00	Project Group Work	

Fri. 2023-11-10	Lecture	
09:30 – 11.00	Technology Survey	Dr. Armin Kraft
11.15 – 12.45	Market and Pricing	Dr. Armin Kraft
13.45 – 15.15	Methodical approach and data input	Dr. Armin Kraft
15.30 – 17.00	Eff Mgmt / Project Group Work	Dr. Armin Kraft

Sat. 2023-11-25	Lecture	
09:30 – 11.00	Project setup – Analyzing	Frank Jirjis
11.15 - 12.45	Circularity I	
13.45 – 15.15	Circularity II - Strategy	
15.30 – 17.00	Circularity III / Project Group Work - Implementation	

Sat. 2023-12-02	Lecture	
09:30 – 12.45	Energy Efficiency in Buildings	Dr. Stephan Seim
13.45 – 15:15	Regulations; KPI; Consequences I	Frank Jirjis
15.30 – 17:00	Regulations; KPI; Consequences II	

Fri. 2023-12-08	Lecture	
09:30 – 11.00	Energy Efficiency in Companies	Jessica Schönebeck
11.15 - 12.45	Energy Efficiency in Companies II	Jessica Schönebeck
13.45 – 15.15	Regulations; KPI; Consequences III	Christian Dworak
15.30 – 17.00	Regulations; KPI; Consequences IV	Christian Dworak

Wed. 2024-01-10	Lecture	
09:30 – 11.00	Energy Efficiency in Companies	Jessica Schönebeck
11.15 - 12.45	Energy Efficiency in Companies II	
13.45 – 15.15	Energy Efficiency in Companies III	
15.30 – 17.00	Energy Efficiency in Companies / Project Group Work	

Fri. 2024-01-19	Lecture	
09:30 – 12.45	Elements of Energy Efficiency in Buildings & in Companies	Dr. Stephan Seim
13:45 – 15.15	Heat Pumps for Heating and Cooling	Dr. Armin Kraft
15.30 – 16.15	Background information for a “one-hour case study” in groups and group work	
16.15 – 17.00	Presentation & Discussion “one-hour case study” in groups Local energy planning	

Fri. 2024-02-02	Interim Presentations

09:30 – 17.00		Prof. Müller-Kirchenbauer Dr. Armin Kraft Gernot Bohmann
Fri. 2024-02-09	Q&A Sessions	
16.00 – 18.00	Multiple Slots Q&A ➔ More Q&A with StS tba	Frank Jirjis Christian Dworak Dr. Stephan Seim

Fri. 2024-02-16	Final Presentations	
09:30 – 17.00		Prof. Müller-Kirchenbauer Frank Jirjis Christian Dworak Jessica Schönebeck

Literature

[1] Quaschning, Volker (2016): Sektorkopplung durch die Energiewende. Anforderungen an den Ausbau erneuerbarer Energien zum Erreichen der Pariser Klimaschutzziele unter Berücksichtigung der Sektorkopplung. Hochschule für Technik und Wirtschaft Berlin. Berlin, 2016.
[2] Sterner/Stadler (2014): Energiespeicher: Bedarf, Technologien, Integration. Berlin: Springer Vieweg.
[3] Siemens (2016), Improve building performance with Energy Efficiency Tools
[4] Subhes C. Bhattacharyya (2011). Energy Economics, p. 146 ff.
[5] Siemens (2009). Brochure 'Building automation – impact on energy efficiency'.
[6] UBA (2014): Treibhausgasneutrales Deutschland im Jahr 2050. Dessau-Roßlau, 2014.
[7] UBA (2012): Energieeffizienzdaten für den Klimaschutz. Dessau-Roßlau, 2012.
[8] Wohlfarth, K. et al. (2015).
[9] L. D. Danny Harvey, Springer Science + Business Media B.V. (2009). 'Reducing energy use in the buildings sector: measures, costs, and examples'.
[10] Senate Department for Urban Development and Environment (2016): Klimaneutrales Berlin 2050 – Empfehlungen für ein Berliner Energieund Klimaschutzprogramm (BEK); https://www.berlin.de/sen/uvk/klimaschutz/klimaschutz-in-der-umsetzung/das-berliner-energie-undklimaschutzprogramm-bek/der-weg-zum-bek/#bek-konsolidiert
[11] Siemens (2009). Brochure 'Building automation – impact on energy efficiency'.

E2 Project Management Skills – Managing (Agile) Projects and Product Development

6 ECTS – hosted by Energy Management

Prof. Dr. André Dechange

Professor at Fachhochschule Dortmund –
University of Applied Sciences and Arts

Aims and Scope

The overall qualification goal of the module is to enable the students to plan, implement, and successfully complete projects economically, efficiently, and according to modern agile and classic management methods. They understand the project or product life cycle and, based on the mediating classic and agile project and product management methodology, they can create, analyze, interpret and evaluate individual essential building blocks of project management and apply them future-oriented. They will learn about challenges in ensuring quality (quality management), opportunities, and threats in development and implementation (risk management), and the principles of identifying user needs (requirements management). Furthermore, the students learn the roles, tasks, and processes in modern project management, as well as the special features and challenges in stakeholder management, and can implement this in the future in a communication and information management strategy. Also, the students are aware of the similarities and differences between individual and multi-project / project portfolio management.

At the end of the course, the students can act in the mediated roles in agile and classic projects, understand the essential project management processes, can generate central management documents themselves, and can apply and further deepen the methodology in future projects.

Course Content

Mediation of the project and product management modules: project organization (e.g. project management manual), goal planning (vision, strategy, concept, business case, project plan), process, schedule and cost planning, resource planning, information and reporting, stakeholder management, requirements management, risk management, quality management, getting to know different development strategies (e.g. general (waterfall), incremental, iterative), presentation of classic project management methods (PRINCE2, IPMA) and agile methods (e.g. SCRUM) as well as application in mini-scenarios, mediation of roles, committees and most important Stakeholders (needs, measures of stakeholder management) in project management (including assignments and case studies), getting to know risk management methods, agile according to SCRUM and classic according to AXELOS Management of Risk (M_o_R), getting to know requirements management methods, agile according to SCRUM and classic according to IREB (International Requirements Engineering Board), project phase (e.g. Use of business cases from previous modules to create project plans, requirement sketches or risk management measures).

Examination (6 ECTS, graded)

Assessment: The course will be graded, but the grade does not count toward your overall GPA
Type of assessment: **Portfolio**
Students who do not pass may repeat at the end of the current semester.
Task and point allocation

- Contribution to the discussion: 25%
- Oral presentation: 50%
- Presentation materials / written composition (term paper): 25%

Schedule

Fridays and Saturdays

27.10.23	2022Elct-APMS-L1
18.10.23	2022Elct-APMS-L2
30.11.23	2022Elct-APMS-L3
01.12.23	2022Elct-APMS-L4
12.01.24	2022Elct-APMS-L5
13.01.24	2022Elct-APMS-L6
25.02.24	2022Elct-APMS-L7 = Examination
26.02.24	2022Elct-APMS-L8 = Examination

Literature

AXELOS (2017), Managing Successful Projects with PRINCE2, 7th ed., The Stationery Office, London.

E3 Rural Electrification

6 ECTS – hosted by Energy Management

Dr. Dawud Ansari, M.Sc.
Director and co-founder at EADP
Research associate at the German Institute for Economic Research (DIW Berlin
Freelance consultant
(Senior) Lecturer at multiple institutions

Aims and Scope

Students can describe, analyze, and evaluate the role of developing and emerging countries in global energy systems as well as their local and regional challenges, peculiarities, and opportunities. You can explain and apply energy-related macroscopic concepts such as economic development and path dependency. Students understand macroscopic concepts as well as political programs and efforts related to energy in developing and emerging countries and can contextually classify and evaluate measures and developments, especially against the background of the term energy poverty and its characteristics. Students are familiar with various off-grid technologies and can choose between them, including the use of suitable methods of integrative planning. Finally, students can act better in group projects, understand the process of development cooperation and can understand and design central elements in it, and are aware of their responsibility for global as well as local sustainable development.

Course Content

Global energy (long-term scenarios, determinants of the world energy system, energy in developing and emerging economies); Sustainable development (SDGs, growth and development theory, Hartwick rule, resource dependency, and diversification, case studies); Energy poverty and access (definition, empirical data, generation and consumption patterns of low-income households, subsidies for fossil fuels and reforms, the role of energy efficiency, case studies); Rural electrification and off-grid technologies (off-grid technologies, computer-assisted planning of off-grids including the basics of mixed-integer optimization, economics, and management in off-grids, the practice of development cooperation); Project phase (e.g. off-grid design, development cooperation, business case).

Examination (6 ECTS, graded)

Assessment: The course will be graded, but the grade does not count toward your overall GPA
Type of assessment: **Portfolio**
Students who do not pass may repeat at the end of the current semester.
Task and point allocation

- Contribution to the discussion: 25%
- Oral presentation: 50%
- Presentation materials / written composition (term paper): 25%

Schedule

Wednesdays, 18.10.23, 01.11.23, 15.11.23, 06.12.23, 17.01.24, 31.01.24, 09.02.24, 23.02.24

18.10.23 **Lecture: Session I The global energy system & long-term scenarios**

09:30 - 17:00 Dr. Dawud Ansari

- Stylised facts
- Energy outlooks and long-term trends
- Foundations of energy (system) modelling
- Scenario planning I

01.11.23 **Lecture: Session II Rural electrification I: Basics & technologies**

09:30 – 11.00 Dr. Dawud Ansari
11.15 - 12.45 Dr. Dawud Ansari / Wassim Brahim
13.45 – 15.15 Wassim Brahim
15.30 – 17.00 Company Presentation N.N.

15.11.23 **Lecture: Session III Rural electrification II: Economics, cases, trends**

09:30 – 11.00 Dr. Dawud Ansari
11.15 - 12.45 Wassim Brahim
13.45 – 15.15 Nico Peterschmidt, INENSUS GmbH
15.30 – 17.00 Dr. Dawud Ansari / Wassim Brahim

06.12.23 **Lecture: Session IV International development**

09:30 – 11.00 Dr. Dawud Ansari
11.15 - 12.45 Wassim Brahim
13.45 – 15.15 Wassim Brahim
15.30 – 17.00 Consultation hours for ongoing project work, Dr. Dawud Ansari

17.01.24 **Lecture: Lecture: Session V The economics of growth, energy access, and sustainability**

09:30 – 11.00 Dr. Dawud Ansari
11.15 - 12.45 Dr. Dawud Ansari
13.45 – 15.15 Company Presentation: International Energy Agency
15.30 – 17.00 Consultation hours for ongoing project work, Dr. Dawud Ansari

- Economic growth and energy
- Sustainable development
- Alternative growth models
- Scenarios III

31.01.24 **Lecture: Session VI Resources, political economy, and climate change PLUS Q&A Sessions**

09.30 – 12.45 Dr. Dawud Ansari
13.45 – 17.00 Multiple Slots Q&A: Dr. Dawud Ansari

- Sustainability
- The resource curse
- Climate change and stranded assets

09.02.24 **Examination Presentation - Handing in of presentation!**
09.30 – 17.00 Dr. Dawud Ansari
Wassim Brahim
N.N.

23.02.24 **Summary, fishbowl discussion, reflection session**
09.30 – 12.45 Dr. Dawud Ansari
Handing in of revised presentation!

Literature

[1] Ansari, D., Holz, F., & Al-Kuhlani, H. (2020). Energy Outlooks Compared: Global and Regional Insights. Economics of Energy & Environmental Policy, 9(1).
[2] Herbst, A., Toro, F., Reitze, F., & Jochem, E. (2012). Introduction to energy systems modelling. Swiss journal of economics and statistics, 148(2), 111-135.
[3] Klein, G. (2007). Performing a project premortem. Harvard business review, 85(9), 18-19.
[4] Wack, P. (1985). Scenarios: uncharted waters ahead. Harvard business review, 63(5), 72-89.
[5] Karplus, V. J., & Von Hirschhausen, C. (2019). Electricity Access: An Introduction. Economics of Energy & Environmental Policy, 8(1).
[6] Mandelli, S., Barbieri, J., Mereu, R., & Colombo, E. (2016). Off-grid systems for rural electrification in developing countries: Definitions, classification and a comprehensive literature review. Renewable and Sustainable Energy Reviews, 58, 1621-1646.
[7] ESMAP: Results-based aid in the energy sector - An Analytical Guide
[8] Team Technologies, Inc. / Operations Core Services / Worldbank: Logframe Handbook
[9] Practical Concepts Incorporated (PCI): The Logical Framework - A manager's guide to a scientific approach to design & evaluation

E4 Integration of Renewable Energies

6 ECTS – hosted by Building Sustainability

Dipl.-Ing. Martin Schnauss
Renewables Academy AG (RENAC)
www.renac.de

Aims and Scope

This module revisits and broadens students' knowledge of energy technologies and systems in the context of today's changing world, preparing the foundation for the coming modules. Students are taught to apply this knowledge independently to selected cases.

Course Content

Students will gain a basic understanding of the applications and limitations of renewable energy sources in a building environment. In this context, students will develop academic research skills in the field of the design of energy supply systems for buildings and neighborhoods based on renewable energy sources and their interaction with conventional/fossil resources.

Note: Focus will be on Solar Thermal!

Examination (6 ECTS, graded)

Assessment: The course will be graded, but the grade does not count toward your overall GPA
Type of assessment: **Portfolio**
Students who do not pass may repeat at the end of the current semester.
Task and point allocation

- Contribution to the discussion: 25%
- Oral presentation: 50%
- Presentation materials / written composition (term paper): 25%

Schedule

Tuesdays: **17.10.23, 31.10.23, 14.11.23, 28.11.23, 12.12.23, 16.01.24, 30.01.24, and (06.02.24 - Exam)**

Literature

[1] Duffie, Beckmann; Solar Engineering of Thermal Processes; ISBN 0-471-51056-4; 1991
A very comprehensive fundamental and scientific explanation of the physical and mathematical background of solar radiation end engineering. (Also known as the "Bible of solar technology").

[2] Dr. Felix A. Peuser, Karl-Heinz Remmers, Martin Schnauss; Solar Thermal Systems; ISBN: 1-902916-39-5; 2002
Summarises very colourful the theoretical and practical knowledge from 20 years of research, implementation and operation of solar thermal installations.

[3] Khartchenko, Nikolai; Thermische Solaranlagen; ISBN: 978-3-89700-372-9; 2004
Basic knowledge and physical background of solar technology (in German).

[4] DGS; Planning and Installing Solar Thermal Systems; ISBN: 9781844071258; 2004 (revised 2008)
A very practical and detailed folder for support in system design and installation

[5] Dr. Sonne Team, Klaus Oberzig; BINE Informationspaket Solare Wärme; ISBN 978-3-934595-73-6
Basic theoretical and practical information for solar installations in Germany.

[6] Franklin Research Center, US Department of Housing and Urban Devel, US Department of Energy; Hot Water from the Sun: A Consumer Guide to Solar Water Heating; ISBN-10: 1410220370; 2005
Consumer orientated guide to solar water heating

[7] Eben V. Fodor; The Solar Food Dryer; ISBN-10: 0865715440; 2006
Basic information for installation and use of food dryers.

[8] Ramlow , Bob; Solar Water Heating (Mother Earth); ISBN-10: 0865715610; 2006
Historical review and practical introduction to modern solar energy systems

[9] Trimby, Paul; Solar Water Heating; ISBN 1 90217 530 1; 2008
A do it yourself guide for installation of solar water heaters.

[10] Laughton, Chris; Solar domestic water heating; ISBN: 978-1-84407-736-6; 2010
A very practical guideline for system design real installation**.**

E5 User-Centered Business Model Innovation & Research

6 ECTS – hosted by Building Sustainability

Dr. Maren Borkert

School of Economics and Management
Centre for Entrepreneurship
T.U. Berlin

Karina Cagarman

School of Economics and Management
Centre for Entrepreneurship
T.U. Berlin

Aims and Scope

The User-Centred Innovation & Research module is an interdisciplinary project that awards 6 ECTS for one semester. The course combines theoretical input sessions with practice and project-based learning. The student teams form diverse teams and jointly collaborate to develop their business ideas into an offer that is pitched to (external) experts. Inspired by methods from design- thinking and lean start-ups, students learn and experience innovation management, team building, qualitative and quantitative business research as well as user-centered business model development in practice. With an entrepreneurial spirit, the teams work with various interest groups (industry, government, and startups) to tackle the hot challenges of our time.

Course Content

Innovation management basics, open & user innovation, team building, and team management, design thinking and lean startup methods, data analysis, business research methods, user-centred business modeling, prototyping.

Examination (6 ECTS, graded)

Assessment: The course will be graded, but the grade does not count toward your overall GPA
Type of assessment: **Portfolio**
Students who do not pass may repeat at the end of the current semester.
Task and point allocation

- Contribution to the discussion: 25%
- Oral presentation: 50%
- Presentation materials / written composition (term paper): 25%

Schedule

Dates: 28.10.23, 09.11.23, 11.11.23, 24.11.23, 09.12.23, 13.01.24, 27.01.24, and (03.02.24 - Exam).

Literature

[1] Donald L. Anderson. Organization Development. The Process of Leading Organizational Change. Sage Publications, 2010.

[2] Thomas Bieger. Zukünftige Geschäftsmodelle: Konzept und Anwendung in der Netzökonomie; mit 3 Tabellen. Springer, 2002.

[3] Roman Boutellier and Mareike Heinzen. Growth Through Innovation: Managing the Technology-Driven Enterprise. Springer, 2014.

[4] Peter F. Drucker. Innovation and Entrepreneurship. HarperBusiness, 2006.

[5] Jack R. Meredith and Jr. Samuel J. Mantel. Project Management. A Managerial Approach. John Wiley & Sons, 2006.

[6] Barbara Praetorius, Dierk Bauknecht, Martin Cames, Corinna Fischer, Martin Pehnt, Katja Schumacher, and Jan-Peter Foß. Innovation for Sustainable Electricity Systems. Exploring the Dynamics of Energy Transitions. Physica, 2009.

[7] V W Ruttan. Technology, Growth, and Development. An induced innovation perspective. Oxford University Press, 2001.

[8] Melissa A. Schilling. Strategic Management of Technological Innovation. Mcgraw-Hill Education, 2013.

[9] Joe Tidd and John Bessant. Strategic Innovation Management. Wiley, 2014.

[10] Paul Trott. Innovation Management

E6 Energy efficient society

6 ECTS – hosted by Building Sustainability

Prof. Julian Wékel

Academic Director
Building Sustainability – Management Methods for Energy Efficiency MBA
www.master-in-energy.com

Aims and Scope

The aim of energy-efficient buildings is embedded in specific socio-economic discourses. The idea of energy efficiency can, therefore, be understood differently according to the social and cultural context.

This module examines different understandings of energy efficiency and its consequences for project managers (i.e. students of this master's program), other building and energy experts, users, and society.

Students also gain knowledge and skills for dealing with different target groups and reflecting on their own projects that have been developed in other courses or introduced in practice-based lecture series.

Course Content

Students taking this module will

- be introduced to different ways of understanding energy efficiency in a more global context
- learn about the social consequences of energy efficiency
- learn more about the different roles and professional profiles of students
- analyze good and bad project management practices, including in their own project work
- acquire skills to deal with complex and diverse target groups (i.e. peer experts, contractors, and users in different project contexts)
- acquire conflict management skills (communication, participation, and cooperation)

Examination (6 ECTS, graded)

Assessment: The course will be graded, but the grade does not count toward your overall GPA
Type of assessment: **Portfolio**
Students who do not pass may repeat at the end of the current semester.
Task and point allocation

- Contribution to the discussion: 25%
- Oral presentation: 50%
- Presentation materials / written composition (term paper): 25%

Schedule

Mondays: 16.10.23, 30.10.23, 13.11.23, 27.11.23, 11.12.23, 15.01.24, 29.01.24, and (12.02.24 - Exam)

Literature

TBA

E7 Data Analysis and ICT in Mobility – Python and R

6 ECTS – hosted by Sustainable Mobility

Dr. Robert Schönduwe

H2Mobility

Hamid Mostofi

Institute of Vocational Education and Work Studies
Technische Universität Berlin

Aims and Scope

The course is divided into two parts: (1) an introduction to data science, statistical methods and the programming language Python is given by Dr. Hamid Mostofi. (2) an introduction to mobility data sources and data analysis with the language R is given by Dr. Robert Schönduwe.

In the **first part**, data science & Python, students will review and gain knowledge about:

- The process of data preparation for data mining,
- Descriptive techniques and Statistical inference
- Regression including linear and nonlinear models
- Understand the context of the observable and latent variables and how to measure latent variables in the context of business analysis and social science through SEM techniques
- Understanding the application of nonlinear regression and time series
- Development of skills in the field of advance visualization techniques
- Understanding the principles of Machine Learning (ML) and its applications for business analysis
- Developing the knowledge and skill in the field of Social Network concept and Techniques like Community detection

In the **second part**, mobility data & data analysis with R and R Studio, students will gain knowledge about:

- Mobility data sources
- Data wrangling, management and visualization with R
- Data collection and techniques
- GPS and mobile network data

Examination (6 ECTS, pass/fail)

Assessment: The course will be graded, but the grade does not count toward your overall GPA
Type of assessment: **Portfolio**

Task and point allocation

- Examination requirements: regular and active participation
- Presentation 30min (R): 50%
- Paper 10-15pages (Python): 50%

In case of failure, a term paper (written, 20 pages, 20 days) will be handed in at the beginning of the following semester.

Schedule (content & dates)

19.10.2023: 10:00-12:00 (Excursion CityLAB) CityLAB
19.10.2023: 16:00-19:30 (Statistics – Dr. Hamid Mostofi) ONLINE
02.11.2023: 16:00-19:30 (Statistics – Dr. Hamid Mostofi) ONLINE
09.11.2023: 13:30-17:00 (R – Dr. Robert Schönduwe) EUREF
16.11.2023: 13:30-17:00 (R – Dr. Robert Schönduwe) EUREF
23.11.2023: 13:30-17:00 (R – Dr. Robert Schönduwe) EUREF
05.12.2023: 13:30-17:00 (R – Dr. Robert Schönduwe) EUREF
07.12.2023: 13:30-17:00 (R – Dr. Robert Schönduwe) EUREF
15.12.2023: 13:30-17:00 (Python – Dr. Hamid Mostofi) EUREF
18.12.2023: 13:30-17:00 (Python – Dr. Hamid Mostofi) EUREF
19.12.2023: 13:30-17:00 (Python – Dr. Hamid Mostofi) EUREF
07.01.2024: Python Report Submission
11.01.2024: 10:00-13:30 (R Final Presentations) EUREF

Additional company visits or presentations might be scheduled.

E8 Urban and Transport Planning in Emerging Economies: Concepts and Experiences

6 ECTS – hosted by Sustainable Mobility

Dr.-Ing. Wulf-Holger Arndt

T.U. Berlin

Aims and Scope

After taking this module, students will:

- be familiar with the urban and transport planning experiences in Emerging Economies;
- know smart city concepts, theories, and criticisms
- Use this knowledge to apply analytical methods in various institutional and economic contexts;
- Develop effective instruments based on these.

Course content

- Designing Sustainable Urban Mobility Plans;
- Stakeholder strategies-tools and methods, social, gender and cultural aspects;
- Regulatory frameworks, financing, and institutional challenges;
- The role of transport options for a sustainable economy: indicators for monitoring and assessing;
- Knowledge and technology exchange - transfer and barriers;
- Mobility challenges in the developing world on a rural and urban scale;
- Megacities, Smart city concepts, theories, and criticism.

Examination (6 ECTS, graded)

Assessment: The course will be graded, but the grade does not count toward your overall GPA
Type of assessment: **Portfolio**
Task and point allocation

- Examination requirements: regular and active participation
- Presentation: 50%
- Paper: 50%

In case of failure, a term paper (written, 20 pages, 20 days) will be handed in at the beginning of the following semester.

Schedule (content & dates preliminary)

23.10.2023: 09:00-17:00 (Dr. Wulf-Holger Arndt) HBS002
24.10.2023: 09:00-17:00 (Dr. Wulf-Holger Arndt) HBS002
08.11.2023: 09:00-17:00 (Fabian Deter) HBS002
17.11.2023: 09:00-17:00 (Dr. Wulf-Holger Arndt) HBS010
20.11.2023: 09:00-17:00 (Dr. Wulf-Holger Arndt) HBS002
21.11.2023: 09:00-17:00 (Dr. Wulf-Holger Arndt) HBS010
04.12.2023: 09:00-17:00 (Dr. Wulf-Holger Arndt) HBS002
14.12.2023: 09:00-17:00 Final Presentations HBS002

E9 Business Models and Investments in Sustainable Mobility

6 ECTS – hosted by Sustainable Mobility

Dr. Gabriele Grea

Department of Social and Political Sciences
Università Bocconi (Italy)

Dr. Daniel Kurth

Private consultant

Aims and Scope

After taking this module, students will:

- understand the basic principles of financial instruments;
- be able to apply these in order to implement sustainable mobility;
- be able to evaluate traditional and innovative business models in sustainable mobility.
- be able to develop innovative economic and financial models;

Course content

Transport investment

- Sources and limits of financial resources for sustainable mobility;
- Investment calculation;
- Critically linking project financing, decision-making, and investment analysis.
- Concept of the infrastructure cycle and long-term investment;

Business models

- Traditional and innovative business models;
- Sharing economy and crowdfunding;
- Designing a business model (select product/service; determine benefits, analyze and identify the market, revenue model, value chain).

Examination (6 ECTS, graded)

Assessment: The course will be graded, but the grade does not count toward your overall GPA
Type of assessment: **Portfolio**
Task and point allocation

- Examination requirements: regular and active participation
- Presentation : 50%
- Paper : 50%

In case of failure, a term paper (written, 20 pages, 20 days) will be handed in at the beginning of the following semester.

Schedule (content & dates preliminary)

06.11.2023: 09:00-17:00 (Dr. Daniel Kurth) EUREF
07.11.2023: 09:00-17:00 (Dr. Daniel Kurth) EUREF
18.11.2023: 09:00-17:00 (Dr. Gabriele Grea) EUREF
08.01.2024: 09:00-17:00 (Dr. Gabriele Grea) EUREF
09.01.2024: 09:00-17:00 (Dr. Gabriele Grea) EUREF
22.01.2024: 09:00-17:00 (Dr. Gabriele Grea) EUREF
23.01.2024: 09:00-17:00 (Dr. Gabriele Grea) EUREF
19.02.2024: 09:00-17:00 Final Presentations EUREF

Master Thesis

Supervisors Individual.

Aims and Scope Students demonstrate with the Master Thesis to be capable to address a problem from their study program independently, based on scientific methods, within a specific deadline. Once registered for the thesis, students have four months to conclude.

Schedule To start the master thesis, 60 CP must have been attained; this equals the successful completion of all mandatory modules. Technically, the earliest starting date is hence six weeks after the last exam. The thesis can be postponed but should be completed in the third term. However, if you would like to get your certificate at the official graduation ceremony in June, 28, 2024, it should be submitted in November/December 2023.

Contents Individual.

Form Fifty pages, plus introduction and annex (es). In English. Scientific standards prerequisite. More detailed formal requirements to be announced.

DATE Thesis will be developed in the third semester.

MBA Alumni network

With your degree, you become part of the alumni network. Alumni receive invitations to participate in the further extension of the academic program, and to events held on the campus and within the network.

As the program rolls over, you are cordially invited to participate in the curricular and extracurricular events of the following academic year(s)